

Foraging modes, foraging scales, and the failure of the Lévy Foraging Hypothesis.
Simon Benhamou, CEFE, CNRS Montpellier

Two related questions have been addressed about Lévy Walks (LW): (1) Can random search movement patterns be suitably modelled using such a scale-free walk? and (2) Is it an efficient searching process when prey locations are unpredictable? I will focus here on the question of the comparative efficiency of LW and Composite Brownian Walk (CBW) processes in patchy environments, irrespective of their resulting patterns, which can be quite similar. CBW is a two-mode two-scale walk that outperforms LW when prey encountered are systematically detected, but one can wonder if the intrinsic ability of LW to perform internally-driven scanning would not give it a selective advantage when prey are hard to detect. Internally-driven scanning can also be easily implemented in CBW if needed. It appears that (1) this type of scanning is useful only for foragers that are fully or almost blind when moving, or equivalently, that search for extremely cryptic prey, and (2) CBW outperforms LW also in this case. The apparent advantage of using LW with intermediate μ value (highlighted when such a LW is compared to a straight line walk corresponding to $\mu < 1.1$ or to a simple Brownian walk corresponding to $\mu > 3$, rather than to strong alternatives such as CBW) does not come from its anomalous dynamics, as claimed by advocates of the Lévy Foraging Hypothesis, but from its ability to partly mimic the behaviour of CBW, which remains more efficient in resting on a more rational use of environmental feed-backs.